

## **Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. – 8. (canceled)

9. (currently amended) A self-contained device for painless, intramuscular ~~inter-muscular~~ injection of a liquid medicament, comprising:

- a) a housing having a base for attachment to the skin of a patient,
- b) an injection needle disposed substantially perpendicular to the base and within the housing, the needle having an outside diameter less than about 0.38 mm, an inlet end and an opposed injection end, and being configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base,
- c) a reservoir containing a liquid medicament,
- d) a means for liquid communication between the reservoir and the injection needle,
- e) a means for inserting the injection needle to its second position,
- f) a means for pumping the medicament from the reservoir to the injection end of the injection needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

10. (original) The device according to claim 9 wherein the volumetric flow rate is from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

11. (original) The device according to claim 9 wherein the means for pumping the medicament is selected from the group consisting of a mechanical pumping means, a pneumatic pumping means, an electronic means, and an electro-mechanical pumping means.

12. (original) The device according to claim 9 further comprising a means for pre-selecting the depth of insertion of the injection needle at its second position.

13. (previously presented) The device according to claim 9 further comprising a means for retracting the injection needle from its second position to a third position within the housing.

14. (currently amended) A self-contained device for painless, intramuscular ~~inter-muscular~~ injection of a liquid medicament, comprising:

a) a housing having a base for attachment to the skin of a patient,

b) an injection needle disposed within the housing, the needle having an outside diameter greater than 0.20 mm and less than about 0.32 mm, having an inlet end and an opposed injection end, and being configured for movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends through the base,

c) a reservoir containing a liquid medicament,

d) a means for liquid communication between the reservoir and the injection needle,

e) a means for inserting the injection needle to its second position,

f) a means for pumping the medicament from the reservoir to the injection end of the injection needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

15. (original) The device according to claim 14 wherein the volumetric flow rate is from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

16. (original) The device according to claim 14 wherein the means for pumping the medicament is selected from the group consisting of a mechanical pumping means, a pneumatic pumping means, an electronic means, and an electro-mechanical pumping means.

17. (original) The device according to claim 14 wherein the injection needle disposed in its first position substantially perpendicular to the base.

18. (original) The device according to claim 14 further comprising a means for pre-selecting the depth of extension of the injection needle at its second position.

19. (currently amended) A self-contained device for painless, intramuscular ~~inter-muscular~~ injection of a liquid medicament, comprising:

- a) a housing having a base for attachment to the skin of a patient,
- b) an injection needle disposed substantially perpendicular to the base and within the housing, the needle having an outside diameter less than about 0.038 mm, an inlet end and an opposed injection end, and being configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base,
- c) an empty reservoir for receiving and containing a liquid medicament,
- d) a means for liquid communication between the reservoir and the injection needle,
- e) a means for inserting the injection needle to its second position,
- f) a means for pumping the medicament from the reservoir to the injection end of the injection needle at a substantially constant volumetric flow rate of from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

20. (canceled)

21. (original) The device according to claim 19 wherein the means for pumping the medicament is selected from the group consisting of a mechanical pumping means, a pneumatic pumping means, an electronic means, and an electro-mechanical pumping means.

22. (canceled)

23. (original) The device according to claim 19 further comprising a means for pre-selecting the depth of extension of the injection needle at its second position.

24. – 27. (canceled)

28. (currently amended) A self-contained, automatically-sequencing device for painless, intramuscular ~~inter-muscular~~-injection of a liquid medicament, comprising:

- a) a housing having a base for attachment to the skin of a patient,

b) an injection needle disposed within the housing, the needle having an outside diameter less than about 0.38 mm, an inlet end and an opposed injection end, and being configured for movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base to a distance sufficient for intramuscular insertion thereof,

c) a reservoir containing a liquid medicament,

d) a means for liquid communication between the reservoir and the injection needle,

e) a means for inserting the injection needle to its second position,

f) a means for pumping the medicament from the reservoir to the injection end of the needle, wherein the pumping means pumps the medicament at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ ,

g) a means for retracting the injection needle from its second position to a third position within the housing, and

h) a means for automatically sequencing and activating the inserting means, the pumping means and the retracting means.

29. (canceled)

30. (original) The automatically-sequencing device according to claim 28 wherein the inserting means and the retracting means, independently, are selected from the group consisting of a mechanical means, a pneumatic means, an electronic means, and an electro-mechanical means.

31. – 50. (canceled)

51. (currently amended) A device according to claim 9, wherein the base includes further comprising a means for attaching the base of the self-contained device for semi-permanent attachment to the skin of the patient, the attaching means being configured wherein during the pumping step, a person is ~~is~~ not required to hold the device.

52. (currently amended) A device according to claim 14 ~~[[15]]~~, wherein the base includes further comprising a means for attaching the base of the self-contained device for semi-

permanent attachment to the skin of the patient, the attaching means being configured wherein during the pumping step, a person is ~~is~~ not required to hold the device.

53. (currently amended) A device according to claim 19, wherein the base includes further ~~further comprising~~ a means for attaching the base of the self-contained device for semi-permanent attachment to the skin of the patient, the attaching means being configured wherein during the pumping step, a person is ~~is~~ not required to hold the device.

54. (currently amended) A device according to claim 28 ~~28~~, wherein the base includes ~~further comprising~~ a means for attaching the base of the self-contained device for semi-permanent attachment to the skin of the patient, the attaching means being configured wherein during the pumping step, a person is ~~is~~ not required to hold the device.

55. (new) A self-contained device for painless, intramuscular injection of a liquid medicament, comprising:

- a) a housing having a base that includes a means for semi-permanent attachment of the device to the skin of a patient,
- b) an injection needle disposed substantially perpendicular to the base and within the housing, the needle having an injection end, and configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base to a distance sufficient for intramuscular insertion thereof, the injection needle having an outside diameter greater than 0.20 mm and less than about 0.38 mm,
- c) a reservoir containing a liquid medicament,
- d) a means for liquid communication between the reservoir and the injection needle,
- e) a means for inserting the injection needle to its second position, and
- f) a means for pumping the medicament from the reservoir to the injection end of the needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

56. (new) The device according to claim 55 further comprising a means for retracting the injection needle from its second position to a third position within the housing.

57. (new) The device according to claim 55 wherein the insertion distance from the base is at least 5 mm.

58. (new) The device according to claim 56 wherein the inserting means, the pumping means, and the retracting means are configured for automatically and sequentially:

a. extending the needle from its first position within the housing to its second position into the patient;

b. injecting the medicine via the needle into the patient; and

c. retracting the needle from its second position in the patient to a third position within the housing.

59. (new) A self-contained device for painless, intramuscular injection of a liquid medicament, comprising:

a) a housing having a base that includes a means for semi-permanent attachment of the device to the skin of a patient,

b) an injection needle disposed substantially perpendicular to the base and within the housing, the needle having an outside diameter less than about 0.38 mm, an inlet end and an opposed injection end, and configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base to a distance sufficient for intramuscular insertion thereof,

c) a reservoir containing a liquid medicament, disposed within the housing along a line extending axially from the inlet end of the injection needle,

d) a means for inserting the injection needle to its second position, and

e) a reservoir urging means for moving the reservoir into liquid communication with the inlet end of the injection needle,

f) a means for pumping the medicament from the reservoir to the injection end of the needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ , and

g) a means for retracting the injection needle from its second position to a third position within the housing.

60. (new) The device according to claim 59 wherein the injection needle has an outside diameter greater than 0.20 mm.

61. (new) The device according to claim 59 where the inserting means is selected from the group consisting of a mechanical means, a pneumatic means, an electronic means, and an electro-mechanical means, and the reservoir urging means is selected from the group consisting of a mechanical means, a pneumatic means, an electronic means, and an electro-mechanical means.

62. (new) A self-contained device for painless, intramuscular injection of a liquid medicament, comprising:

- a) a housing having a base that includes a means for semi-permanent attachment of the device to the skin of a patient,

- b) an injection needle disposed substantially perpendicular to the base and within the housing, the needle having an injection end, and configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base to a distance sufficient for intramuscular insertion thereof, the injection needle having an outside diameter greater than 0.20 mm and less than about 0.38 mm,

- c) an empty reservoir for receiving and containing a liquid medicament,

- d) a means for liquid communication between the reservoir and the injection needle,

- e) a means for inserting the injection needle to its second position, and

- f) a means for pumping the medicament from the reservoir to the injection end of the needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

63. (new) The device according to claim 62 wherein the volumetric flow rate is from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

64. (new) The device according to claim 62 wherein the injection needle has a size from 30 gauge to 33 gauge.

65. (new) A self-contained device for painless, intramuscular injection of a liquid medicament, comprising:

- a) a housing having a base for attachment to the skin of a patient,
- b) an injection needle disposed within the housing, the needle having an outside diameter greater than 0.20 mm and less than about 0.32 mm, having an inlet end and an opposed injection end, and being configured for movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends through the base,
- c) an empty reservoir for receiving and containing a liquid medicament,
- d) a means for liquid communication between the reservoir and the injection needle,
- e) a means for inserting the injection needle to its second position,
- f) a means for pumping the medicament from the reservoir to the injection end of the injection needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

66. (new) The device according to claim 65 wherein the volumetric flow rate is from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

67. (new) The device according to claim 65 wherein the needle disposed substantially perpendicular to the base.

68. (new) The device according to claim 65 wherein the injection end of the needle in the second position extends outwardly from the base to a distance sufficient for intramuscular insertion thereof.

69. (new) The device according to claim 65 wherein the base includes a means for attaching the base of the self-contained device for semi-permanent attachment to the skin of the patient.

70. (new) A self-contained device for painless, intramuscular injection of a liquid medicament, comprising:

- a) a housing having a base for attachment to the skin of a patient,



b) an injection needle disposed within the housing, the needle having an outside diameter of about 0.36 mm and less, an inlet end and an opposed injection end, and being configured for axial movement between a first position wherein the injection end is within the housing and a second position wherein the injection end extends outwardly from the base to a distance sufficient for intramuscular insertion thereof,

c) an empty reservoir for receiving and containing a liquid medicament and in liquid communication with the injection needle,

d) a means for inserting the injection needle to its second position,

e) a means for pumping the liquid medicament from the reservoir to the injection end of the injection needle at a substantially constant volumetric flow rate of from about 0.5  $\mu\text{L/s}$  to about 20  $\mu\text{L/s}$ .

71 (new) The device according to claim 70 wherein the volumetric flow rate is from about 1  $\mu\text{L/s}$  to about 4  $\mu\text{L/s}$ .

72. (new) The device according to claim 70 wherein the needle disposed substantially perpendicular to the base.

73. (new) The device according to claim 70 wherein the base includes a means for attaching the base of the self-contained device for semi-permanent attachment to the skin of the patient.